Notice of Allowability	Application No.	Applicant(s)	
	10/519,721	HIKIDA ET AL.	
	Examiner	Art Unit	
	Cindy D. Khuu	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *09/13/06*.

2. ☒ The allowed claim(s) is/are *1-20*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given by Mr. Arthur Garrett during a telephone interview on 09/29/2006.

The application has been amended as follows:

Claims:

Amend claim 13 as followed:

-- An azimuth measuring method comprising:

a step of changing detection directions of two axes for measurement of earth magnetism while keeping the detection directions of two axes on a predetermined plane or changing the detection directions of three axes in a three-dimensional space;

a step of acquiring the 2-axis or 3-axis output data for measurement of earth magnetism when said detection directions change;

a step of deciding whether said output data is acquired a predetermined number of times or more or not;

a step of defining a reference point on a two-dimensional coordinate system whose coordinate values correspond to said 2-axis output data or on a three-dimensional coordinate system whose coordinate values correspond to said 3-axis output data and estimating the coordinates of reference point using a statistical technique so that a variation in the distance from the output data group consisting of the 2-axis or 3-axis output data acquired said predetermined number of times or more to the reference point becomes a minimum;

a step of calculating offset values with respect to said 2-axis or 3-axis output data based on said estimated coordinates of reference point;

a step of storing said calculated offset values; ~~and~~

a step of correcting said output data according to said stored offset values and obtaining azimuth information by performing an azimuth calculation using said output data; and

a step of displaying azimuth result. –

Specification:

Amend Specification as followed:

Replace "claim 1" (page 4, line 8) with – item 1 --.

Replace "claim 2" (page 5, line 26) with – item 2 --.

Replace "claim 1" (page 5, line 27) with – item 1--.

Replace "claim 3" (page 6, line 14) with – item 3 --.

Replace "claim 1" (page 6, lines 14-15) with – item 1 --.

Replace "claim 4" (page 7, line 22) with – item 4 --.

Replace "claim 1" (page 7, line 24) with – item 1 --.

Replace "claim 5" (page 8, line 15) with – item 5 --.

Replace "claim 1" (page 8, line 16) with – item 1 --.

Replace "claim 6" (page 9, line 4) with – item 6 --.

Replace "claim 5" (page 9, line 5) with – item 5 --.

Replace "claim 7" (page 9, line 9) with – item 7 --.

Replace "claim 1" (page 9, line 10) with – item 1 --.

Replace "claim 8" (page 9, line 28) with – item 8 --.
Replace "claim 7" (page 10, line 1) with – item 7 --.

Replace "claim 9" (page 10, line 19) with – item 9 --.
Replace "claim 1" (page 10, line 20) with – item 1 --.

Replace "claim 10" (page 11, line 12) with – item 10 --.
Replace "claim 1" (page 11, line 13) with – item 1 --.

Replace "claim 11" (page 12, line 2) with – item 11 --.
Replace "claim 10" (page 12, line 3) with – item 10 --.

Replace "claim 12" (page 12, line 23) with – item 12 --.
Replace "claim 1" (page 12, line 24) with – item 1 --.

Replace "claim 13" (page 13, line 17) with – item 13 --.

Replace "claim 14" (page 14, line 20) with – item 14 --.
Replace "claim 13" (page 14, line 21) with – item 13 --.

Replace "claim 15" (page 15, line 2) with – item 15 --.
Replace "claim 13" (page 15, line 3) with – item 13 --.

Replace "claim 16" (page 15, line 23) with – item 16 --.
Replace "claim 13" (page 15, line 24) with – item 13 --.

Replace "claim 17" (page 16, line 7) with – item 17 --.
Replace "claim 13" (page 16, line 8) with – item 13 --.

Replace "claim 18" (page 16, line 17) with – item 18 --.

Replace "claim 13" (page 16, line 18) with – item 13 --.

Replace "claim 19" (page 16, line 26) with – item 19 --.
Replace "claim 13" (page 16, line 27) with – item 13 --.

Replace "claim 20" (page 17, line 9) with – item 20 --.
Replace "claim 13" (page 17, line 10) with – item 13 --.

Replace "claims 1 to 12" (page 42, line 25) with – items 1 to 12 --.
Replace "claims 13 to 20" (page 42, line 26) with – items 13 to 20 --.

Pertinent Art Cited

The following US Patent Applications reveal the current state of the art:

Kato et al. (JP 2004-012416) teaches an azimuth measuring device (Drawing 1: Paragraph 27) comprising: earth magnetism detection means with 2 or 3 axes for detecting earth magnetism (1); output data acquisition means (3, 4 or 5) for acquiring 2-axis output data (output of 1 to output of 5) when the orientation of said earth magnetism detection means changes while keeping the detection directions of said two axes on a predetermined plane (Drawing 1: Solution, lines 1-3) or 3-axis output data (output of 1 to output of 5) when the orientation of said earth magnetism detection means changes in a three-dimensional space repeatedly a predetermined number of times or more (Drawing 1: Solution, lines 1-3: Paragraph 34) and offset information calculation means (8) for calculating offset information with respect to the output data of said earth magnetism detection means (Paragraphs 39-40).

However, Kato does not teach at least a reference point estimation means for defining a reference point on a two-dimensional coordinate system whose coordinate values correspond to said 2-axis output data or on a three-dimensional coordinate system whose coordinate values correspond to said 3-axis output data and estimating the coordinates of reference point using a statistical technique so that a

variation in the distance from the 2-axis or 3-axis output data group acquired by said output data acquisition means to the reference point becomes a minimum.

Kuno et al. (US 4,497,034) teaches an azimuth measuring device (Fig. 1) comprising: earth magnetism detection means (1) with 2 axes detecting earth magnetism (Abstract, lines 1-6); output data acquisition means for acquiring 2-axis output data (K2x, K2y) when the orientation of said earth magnetism detection means changes (Orientation of 1 changes when orientation of vehicle changes; Column 3, lines 10-11) while keeping the detection directions of said two axes on a predetermined plane (direction of detection remains of x-y plane, Fig. 3); and offset information calculation means for calculating offset information with respect the output data said earth magnetism detection means based on said coordinates of reference point (See steps 409, 410, 412, 413; Fig. 4).

However, Kuno does not teach at least a reference point estimation means for estimating the coordinates of reference point using a statistical technique so that a variation in the distance from the 2-axis or 3-axis output data group acquired by said output data acquisition means to the reference point becomes minimum.

Allowable Subject Matter

Claims 1-20 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claims 1 and 13 is the inclusion of the limitation "a reference point estimation means for estimating the coordinates of reference point using a statistical technique so that a variation in the distance from the 2-axis or 3-axis output data group acquired by said output data acquisition means to the reference point becomes minimum". The prior art of record, taken alone or in combination, fails to disclose or render obvious.

Claims 2-12 and 14-20 are allowed due to their dependency on claims 1 and 13.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cindy D. Khuu whose telephone number is (571) 272-8585. The examiner can normally be reached on M-F, 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CDK 9/29/06

John Barlow
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